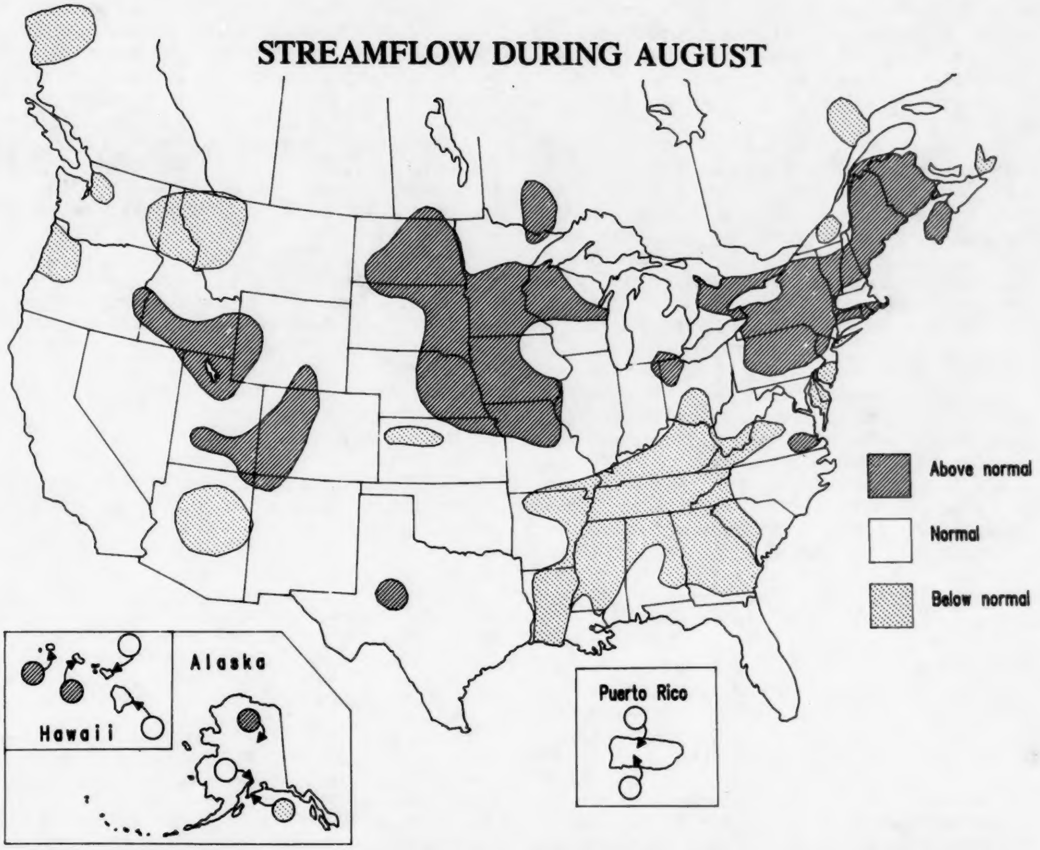
National Water Conditions

UNITED STATES
Department of the Interior
Geological Survey

CANADA
Department of the Environment
Water Resources Branch

AUGUST 1986



Record-low flows for August occurred at index stations in Quebec, Georgia, and Alabama. Monthly mean discharge of the Apalachicola River at Chattahoochee, Florida, was an all-time low for the 58 years of record at that site. Streamflow at the 16 index stations in the Carolinas, Georgia, and Alabama averaged about 69 percent of median during August, compared with 36 percent of median for July.

The heavy rains of August eased drought conditions in parts of the Southeast but also caused flooding which killed three people in South Carolina. In Milwaukee, Wisconsin, two people drowned after 6.79 inches of rain fell on the evening of August 6 causing both stream and urban flooding.

Utah's Great Salt Lake fell only 0.30 foot during August and was at an elevation of 4,210.85 feet on August 31. Alaska's Russell "Lake" continued to rise behind the ice dam of Hubbard Glacier. An August 11-15 survey of terminal-moraine lakes in Oregon's Three Sisters Wilderness Area found that conditions at Carver lake posed a potentially significant hazard.

About 74 percent of the 188 index stations reporting data for August had flows in the normal to above-normal range, compared with the 77 percent in those ranges for last month. Contents of 82 percent of reporting reservoirs were at or above average for the end of August. The combined flow of the 3 largest rivers in the lower 48 States—Mississippi, St. Lawrence, and Columbia—averaged 786,600 cubic feet per second during August, 6 percent above median but 26 percent below last month.

STREAMFLOW CONDITIONS DURING AUGUST 1986

Record-low flows (see table) for August occurred at five index stations: one in Quebec, three in Georgia, and one in Alabama. Monthly mean discharge of the Apalachicola River at Chattahoochee, Florida (see table), was an all-time low for the 58 years of record at that site, and the river was closed to barge transportation early in the month. The Apalachicola Bay oyster industry, which provides 95 percent of the commercial oysters in Florida and was adversely affected by three hurricanes in 1985, will probably be adversely affected by the low river flows. Increased salinity in the area of the oyster beds makes predation by salt-water species such as the oyster drill more likely. Streamflow at the 16 index stations in the Carolinas, Georgia, and Alabama averaged about 69 percent of median during August, compared with 36 percent of median for July, as flow ranged from about 24 percent of median in Georgia to 113 percent of median in North Carolina.

The heavy rains of August (see map) also caused flooding in South Carolina which killed a Sheriff's Deputy near Lexington on August 21, and two people near Newberry, on August 18. About 10.5 inches of rain fell in 7 hours (rainfall frequency may have exceeded the 500-year rainfall according to the State climatologist) causing extensive damage to homes, bridges, and culverts in Newberry, but rainfall amounts in the surrounding area were spotty. Hurricane/Tropical Storm Charlie also caused coastal and small-stream flooding from South Carolina to New Jersey August 16–18. In Milwaukee, Wisconsin, two people drowned after 6.79 inches of rain fell (4 inches in 2 hours) on the evening of August 6 causing both stream and urban flooding. Peak discharge of the Kinnickinnic River at Milwaukee (see table on page 4) was almost twice that of the 100-year flood. Record-high flows (see table) for the month occurred in Nova Scotia and New York, and above-normal flows persisted in the area of Utah's Great Salt Lake. The lake fell only 0.30 foot during August and was at an elevation of 4,210.85 feet on August 31. About 40 percent of the 1-foot fall from the lake's maximum elevation of 4,211.85 feet August 3–8 was due to the August 9 dike breach at the Amax Magnesium Company. A pumping station and canals are to be built to circulate water from the Great Salt Lake to a 500-square-mile artificial lake east of Great Salt Lake in order to both lower lake levels by the spring of 1987 and also to keep Great Salt Lake levels below elevations which cause problems. Alaska's Russell "Lake" continued to rise behind the ice dam of Hubbard Glacier. Instrumentation to measure glacier motion, ice-dam stability, and lake stage is being installed. An August 11–15 survey of terminal-moraine lakes in Oregon's Three Sisters Wilderness Area found that conditions at Carver Lake posed a potentially significant hazard. The impounding moraine is steep, unstable, and vulnerable to erosion. Sloughing of volcanic rocks, or ice from the heavily crevassed Prouty Glacier could generate a flood wave which would destroy the impounding moraine, subject campgrounds along Squaw Creek to sudden flooding, and might pose some hazard to the town of Sisters farther downstream.

Streamflow generally increased contraseasonally in New Brunswick, Maine, New Hampshire, Rhode Island, Massachusetts, New York, and South Carolina; increased seasonally in North Carolina; changed variably in New Jersey, Maryland, Virginia, Tennessee, Georgia, Florida, and Puerto Rico, and generally decreased seasonally in the rest of southern Canada and the United States. About 74 percent of the 188 index stations reporting data for August had flows in the normal to above-normal range, compared with the 77 percent in those ranges for last month.

Above-normal flows persisted in parts of Alaska, Idaho Wyoming, Utah, Colorado, Arizona, New Mexico, the Dakotas, Nebraska, Kansas, Minnesota, Iowa, Missouri, Wisconsin, Illinois, Indiana, Michigan, Ohio, Pennsylvania, New Jersey, New York, Rhode Island, Vermont, Quebec, and Nova Scotia. Flows moved into the above-normal range in parts of Hawaii, Oregon, Idaho, Utah, Ontario, Minnesota, Wisconsin, Pennsylvania, New Jersey, New York, Connecticut, Massachusetts, Vermont, New Hampshire, New Brunswick, Nova Scotia, Virginia, and Texas.

Below-normal flows persisted in Delaware, and also in parts of Washington, Idaho, Montana, Kansas, Arkansas, Mississippi, Alabama, Georgia, the Carolinas, Tennessee, Kentucky, Virginia, Maryland, and New York. Flows decreased into the below-normal range in parts of Alaska, British Columbia, Oregon, Arizona, New Mexico, Missouri, Arkansas, Louisiana, Mississippi, Tennessee, Kentucky, Ohio, West Virginia, New Jersey, Quebec, and Nova Scotia.

Contents of 82 percent of reporting reservoirs were at or above average for the end of August. Only the Baltimore municipal system in Maryland, Douglas Lake and the Little Tennessee Projects in the Tennessee Valley, and Buffalo Bill reservoir in Wyoming reported both below-average contents and declines in contents exceeding 5 percent during August.

The combined flow of the 3 largest rivers in the lower 48 States—Mississippi, St. Lawrence, and Columbia—averaged 786,600 cubic feet per second during August, 6 percent above median but 26 percent below last month. Flow of the St. Lawrence River at Cornwall, Ontario, was above-normal for the 19th consecutive month.

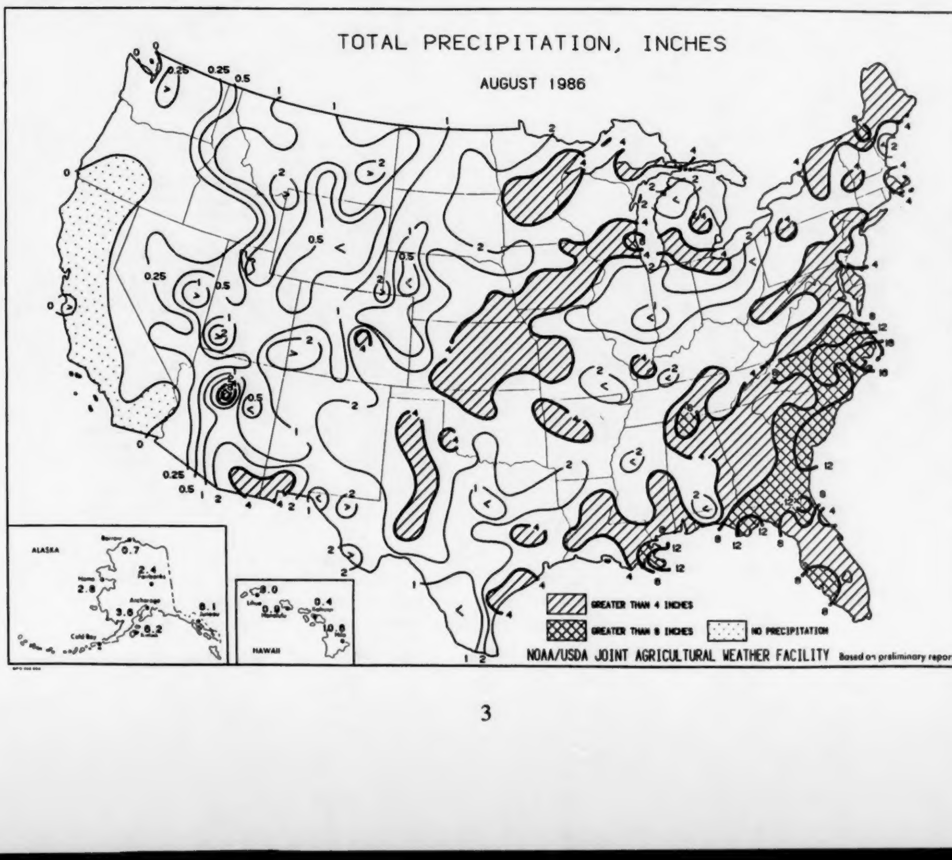
Hydrographs of streamflow at 4 stations for the last 25 months and maps showing both Crop Moisture and Drought Severity for August are on page 4.

CONTENTS

NEW EXTREMES DURING AUGUST 1986 AT STREAMFLOW INDEX STATIONS

Station number	Stream and place of determination	Drainage area (square miles)	Years of record	Previous August extremes (period of record)		August 1986			
				Monthly mean in cfs (year)	Daily mean in cfs (year)	Monthly mean in cfs	Percent of median	Daily mean in cfs	Day
LOW FLOWS									
02226000	Altamaha River at Doctortown, Ga.	13,600	55	2,399 (1954)	2,110 (1954)	2,087	35	1,730	*
02347500	Flint River near Culloden, Ga.	1,850	66	404 (1954)	196 (1951)	179	19	87	6
02358000	Apalachicola River at Chattahoochee, Fl.	17,300	58	7,008 (1957)	5,550 (1957)	4,750	35	. . .	. .
02371500	Conecuh River at Brantley, Ala.	492	49	47.2 (1956)	34 (1954)	33.5	17	22	10
02392000	Etowah River at Canton, Ga.	613	59	328 (1981)	222 (1981)	198	28	131	7
03020300	St. Francois River at Hemmings Falls, Quebec, Canada	3,710	60	737 (1940)	560 (1979)	570	23	. . .	. .
HIGH FLOWS									
01318500	Hudson River at Hadley, N.Y.	1,664	65	2,574 (1976)	7,430 (1953)	2,740	262	4,660	2
01357500	Mohawk River at Cohoes, N.Y.	3,456	68	3,914 (1976)	14,500 (1975)	4,090	256	8,630	16
04262500	West Branch Oswegatchie River near Harrisville, N.Y.	258	70	672 (1981)	2,000 (1962)	739	510	1,610	1
01EF001	LaHave River at West Northfield, Nova Scotia, Canada	484	71	1,580 (1927)	4,250 (1927)	1,878	912	5,826	1

*Occurred more than once.

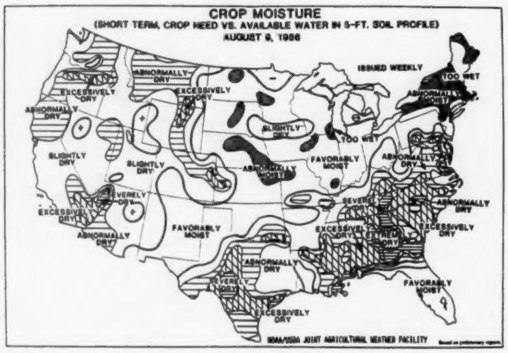


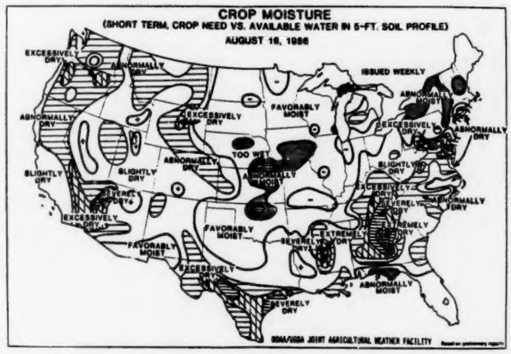
FLOOD DATA FOR SELECTED SITES IN WISCONSIN

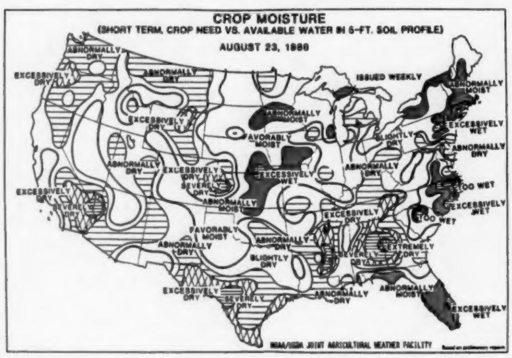
WRD station number	Stream and place of determination	Drainage area (square miles)	Period of known floods	Maximum flood previously known			Maximum during present flood				
				Date	Stage (feet)	Discharge (cfs)	Date	Stage (feet)	Discharge		Recurrence interval (years)
									Cfs	Cfs per square mile	
	SOUTHEASTERN WISCONSIN										
	STREAMS TRIBUTARY TO LAKE MICHIGAN										
04087120	Menomonee River at Wauwatosa....	123	1961–	Apr. 21, 1973	13.92	13,500	Aug. 6	[a]13.1	[a]10,600	86.2	[a]70
04087159	Kinnickinnic River at South 11th Street at Milwaukee	20.2	1976–	Dec. 2, 1982	[b]21.93	4,400		[c]16.01	[a]10,700	530	[d]1.8
04087204	Oak Creek at South Milwaukee......	25.0	1963–	Sept. 13, 1978	8.19	1,020		9.88	1,100	44.0	40

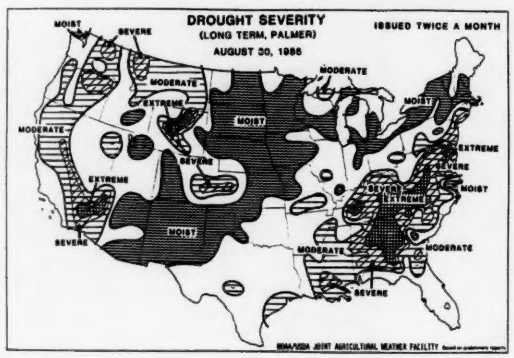
[a]About
[b]At site and datum then in use
[c]From high-water mark
[d]Approximate ratio of discharge to that of 100-year flood

CROP MOISTURE AND DROUGHT SEVERITY









CROP MOISTURE depicts short-term (up to about four weeks) abnormal dryness or wetness affecting agriculture. Responds rapidly, can change considerably from week to week, and indicates normal conditions at the begining and end of the growing season.
DROUGHT SEVERITY INDEX (PALMER) depicts prolonged (months, years) abnormal dryness or wetness. Responds slowly, changes little from week to week, and reflects long-term moisture, runoff, recharge and deep perrolation, as well as evapotranspiration.

(From *Weekly Weather and Crop Bulletin* prepared and published by the NOAA/USDA Joint Agricultural Weather Facility)

Provisional data; subject to revision

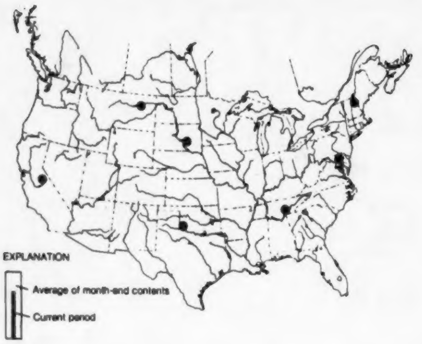
USABLE CONTENTS OF SELECTED RESERVOIRS NEAR END OF AUGUST 1986

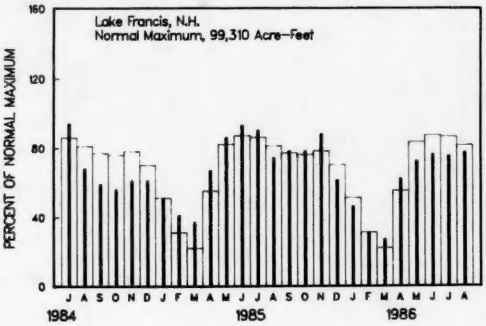
[Contents are expressed in percent of reservoir capacity. The usable storage capacity of each reservoir is shown in the column headed "Normal maximum."]

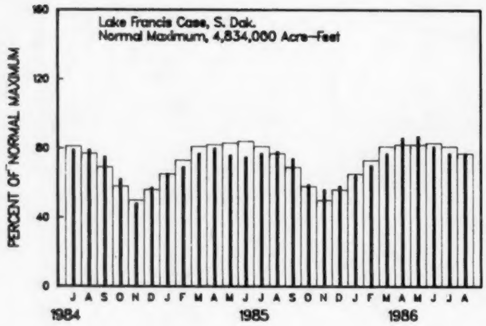
Reservoir Principal uses: F-Flood control I-Irrigation M-Municipal P-Power R-Recreation W-Industrial	Percent of normal maximum				Normal maximum[a] (acre-feet)
	End of Aug. 1986	End of Aug. 1985	Average for end of Aug.	End of July 1986	
NOVA SCOTIA					
Rossignol, Mulgrave, Falls Lake, St. Margaret's Bay, Black, and Ponhook Reservoirs(P)	50	27	49	45	[b]226,300
QUEBEC					
Allard (P)	79	77	69	80	280,600
Gouin (P)	82	93	69	85	6,954,000
MAINE					
Seven reservoir systems (MP)	79	61	68	76	4,107,000
NEW HAMPSHIRE					
First Connecticut Lake (P)	86	85	84	86	76,450
Lake Francis (FPR)	77	74	81	75	99,310
Lake Winnipesaukee (PR)	88	54	75	103	165,700
VERMONT					
Harriman (P)	77	78	71	89	116,200
Somerset (P)	91	64	75	90	57,390
MASSACHUSETTS					
Cobble Mountain and Borden Brook (MP)	77	55	77	83	77,920
NEW YORK					
Great Sacandaga Lake (FPR)	90	65	71	98	786,700
Indian Lake (FMP)	92	83	74	99	103,300
New York City reservoir system (MW)	90	49	79	89	1,680,000
NEW JERSEY					
Wanaque (M)	77	79	75	80	85,100
PENNSYLVANIA					
Allegheny (FPR)	49	42	43	52	1,180,000
Pymatuning (FMR)	95	92	88	97	188,000
Raystown Lake (FR)	67	67	62	67	761,900
Lake Wallenpaupack (PR)	67	71	65	79	157,800
MARYLAND					
Baltimore municipal system (M)	61	80	88	68	261,900
NORTH CAROLINA					
Bridgewater (Lake James) (P)	89	97	88	86	288,800
Narrows (Badin Lake) (P)	75	99	98	78	128,900
High Rock Lake (P)	62	95	74	50	234,800
SOUTH CAROLINA					
Lake Murray (P)	90	96	73	86	1,614,000
Lakes Marion and Moultrie (P)	89	86	70	84	1,862,000
SOUTH CAROLINA—GEORGIA					
Clark Hill (FP)	42	70	67	47	1,730,000
GEORGIA					
Burton (PR)	97	98	87	96	104,000
Sinclair (MPR)	88	92	86	91	214,000
Lake Sidney Lanier (FMPR)	34	59	58	38	1,686,000
ALABAMA					
Lake Martin (P)	76	93	86	81	1,375,000
TENNESSEE VALLEY					
Clinch Projects: Norris and Melton Hill Lakes (FPR)	40	43	46	44	2,293,000
Douglas Lake (FPR)	28	39	47	94	1,394,000
Hiwassee Projects: Chatuge, Nottely, Hiwassee, Apalachia, Blue Ridge, Ocoee 3, and Parksville Lakes (FPR)	54	65	69	43	1,012,000
Holston Projects: South Holston, Watauga, Boone, Fort Patrick Henry, and Cherokee Lakes (FPR)	55	51	54	20	2,880,000
Little Tennessee Projects: Nantahala, Thorpe, Fontana, and Chilhowee Lakes (FPR)	43	52	67	49	1,478,000
WISCONSIN					
Chippewa and Flambeau (PR)	82	86	76	93	365,000
Wisconsin River (21 reservoirs) (PR)	81	76	64	86	399,000
MINNESOTA					
Mississippi River headwater system (FMR)	43	38	34	47	1,640,000
NORTH DAKOTA					
Lake Sakakawea (Garrison) (FIPR)	93	79	93	96	22,700,000
SOUTH DAKOTA					
Angostura (I)	78	49	76	89	127,600
Belle Fourche (I)	39	10	39	62	185,200
Lake Francis Case (FIP)	77	78	77	77	4,834,000
Lake Oahe (FIP)	92	79	. . .	96	22,530,000
Lake Sharpe (FIP)	102	99	100	99	1,725,000
Lewis and Clark Lake (FIP)	92	92	95	89	477,000
NEBRASKA					
Lake McConaughy (IP)	80	71	69	91	1,948,000
OKLAHOMA					
Eufaula (FRP)	94	93	82	97	2,378,000
Keystone (FPR)	93	91	89	97	661,000
Tenkiller Ferry (FPR)	105	105	91	104	628,200
Lake Altus (FIMR)	43	9	47	41	133,000
Lake O'The Cherokees (FPR)	91	94	83	95	1,492,000
OKLAHOMA—TEXAS					
Lake Texoma (FMPRW)	86	88	91	93	2,722,000
TEXAS					
Bridgeport (IMW)	90	75	48	96	386,400
Canyon (FMR)	96	97	77	100	385,600
International Amistad (FIMPW)	53	64	80	51	3,497,000
International Falcon (FIMPW)	36	31	64	39	2,668,000
Livingston (IMW)	97	95	87	100	1,788,000
Possum Kingdom (IMPRW)	91	87	98	94	570,200
Red Bluff (PI)	59	21	22	61	307,000
Toledo Bend (P)	91	86	85	98	4,472,000
Twin Buttes (FIM)	22	9	27	23	177,800
Lake Kemp (IMW)	95	90	83	104	268,000
Lake Meredith (FWM)	25	28	39	26	796,900
Lake Travis (FIMPRW)	86	75	75	92	1,144,000
MONTANA					
Canyon Ferry (FIMPR)	83	78	87	91	2,043,000
Fort Peck (FPR)	81	76	89	82	18,910,000
Hungry Horse (FIPR)	96	83	95	100	3,451,000
WASHINGTON					
Ross (PR)	99	92	95	100	1,052,000
Franklin D. Roosevelt Lake (IP)	94	91	103	96	5,022,000
Lake Chelan (PR)	98	96	98	98	676,100
Lake Cushman (PR)	94	83	96	125	359,500
Lake Merwin (P)	103	102	103	103	245,600
IDAHO					
Boise River (4 reservoirs) (FIP)	57	68	59	73	1,235,000
Coeur d'Alene Lake (P)	98	96	76	21	238,500
Pend Oreille Lake (FP)	98	98	100	98	1,561,000
IDAHO—WYOMING					
Upper Snake River (8 reservoirs) (MP)	66	44	57	77	4,401,000
WYOMING					
Boysen (FIP)	93	74	87	95	802,000
Buffalo Bill (IP)	70	90	89	91	421,300
Keyhole (F)	32	30	46	35	193,800
Pathfinder, Seminoe, Alcova, Kortes, Glendo, and Guernsey Reservoirs (I)	72	62	51	82	3,056,000
COLORADO					
John Martin (FIR)	55	84	18	57	364,400
Taylor Park (IR)	91	95	79	98	106,200
Colorado-Big Thompson project (I)	84	76	63	92	730,300
COLORADO RIVER STORAGE PROJECT					
Lake Powell; Flaming Gorge, Fontenelle, Navajo, and Blue Mesa Reservoirs (IFPR)	95	93	. . .	98	31,620,000
UTAH—IDAHO					
Bear Lake (IPR)	93	83	64	98	1,421,000
CALIFORNIA					
Folsom (FIP)	68	62	68	80	1,000,000
Hetch Hetchy (MP)	91	73	70	100	360,400
Isabella (FIR)	67	41	35	85	568,100
Pine Flat (FI)	66	19	43	87	1,001,000
Clair Engle Lake (Lewiston) (P)	85	79	79	92	2,438,000
Lake Almanor (P)	91	63	59	97	1,036,000
Lake Berryessa (FIMW)	89	78	80	92	1,600,000
Millerton Lake (FI)	58	33	44	87	503,200
Shasta Lake (FIPR)	75	44	70	81	4,377,000
CALIFORNIA—NEVADA					
Lake Tahoe (IPR)	89	66	62	96	744,600
NEVADA					
Rye Patch (I)	81	65	67	95	194,300
ARIZONA—NEVADA					
Lake Mead and Lake Mohave (FIMP)	91	95	74	91	27,970,000
ARIZONA					
San Carlos (IP)	66	76	19	74	935,100
Salt and Verde River system (IMPR)	80	81	42	85	2,019,100
NEW MEXICO					
Conchas (FIR)	86	85	84	89	330,100
Elephant Butte and Caballo (FIPR)	94	87	29	94	2,442,000

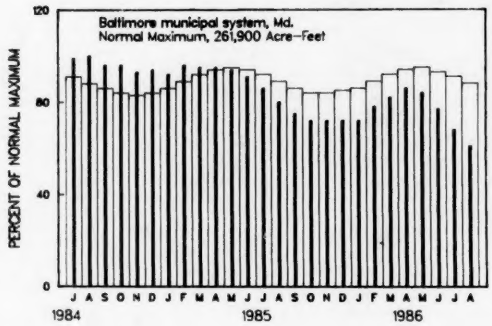
[a]1 acre-foot = 0.04356 million cubic feet = 0.326 million gallons = 0.504 cubic feet per second day.
[b]Thousands of kilowatt-hours (the potential electric power that could be generated by the volume of water in storage).

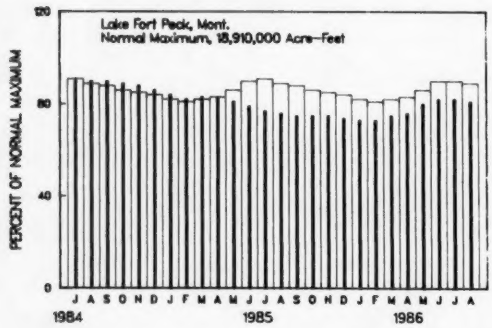
USABLE CONTENTS OF SELECTED RESERVOIRS AND RESERVOIR SYSTEMS

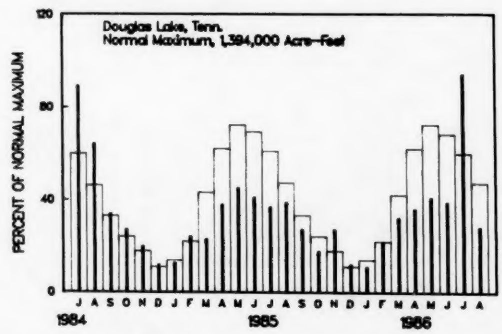


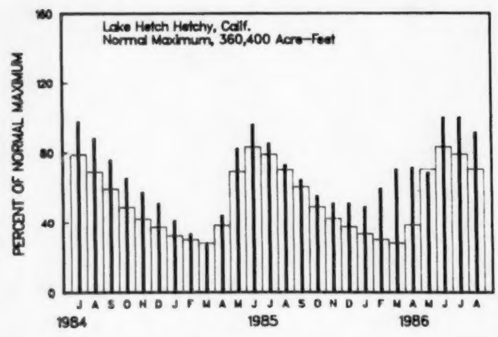


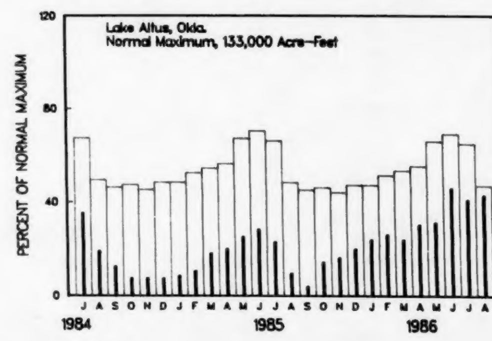












Provisional data; subject to revision

FLOW OF LARGE RIVERS DURING AUGUST 1986

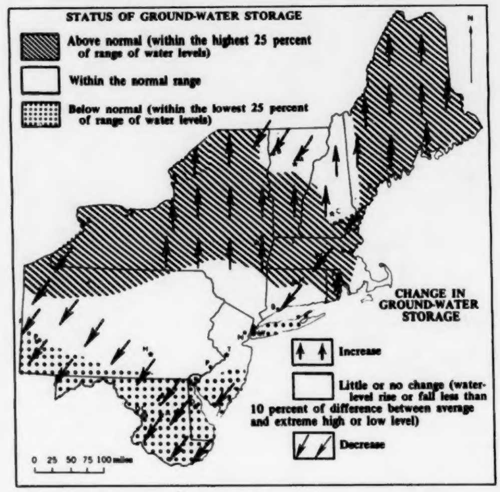
Station number	Stream and place of determination	Drainage area (square miles)	Average discharge through September 1980 (cubic feet per second)	August 1986: Monthly mean discharge (cubic feet per second)	August 1986: Percent of median monthly discharge, 1951–80	August 1986: Change in discharge from previous month (percent)	Discharge near end of month: Cubic feet per second	Discharge near end of month: Million gallons per day	Discharge near end of month: Date
01014000	St. John River below Fish River at Fort Kent, Maine	5,690	9,647	13,050	315	+44	13,000	8,400	31
01318500	Hudson River at Hadley, N.Y.	1,664	2,909	2,740	262	+13	3,040	1,964	31
01357500	Mohawk River at Cohoes, N.Y.	3,456	5,734	4,090	256	+23	2,380	1,538	31
01463500	Delaware River at Trenton, N.J.	6,780	11,750	7,560	166	+34	4,120	2,662	31
01570500	Susquehanna River at Harrisburg, Pa.	24,100	34,530	15,400	178	+1	8,660	5,597	31
01646500	Potomac River near Washington, D.C.	11,560	[1]11,490	[1]2,250	65	−16	1,960	1,266	31
02105500	Cape Fear River at William O. Huske Lock near Tarheel, N.C.	4,810	5,005	2,590	103	+164	1,500	970	31
02131000	Pee Dee River at Peedee, S.C.	8,830	9,851	5,640	105	+205	6,400	4,140	26
02226000	Altamaha River at Doctortown, Ga.	13,600	13,880	2,087	35	+9	2,310	1,492	28
02320500	Suwannee River at Branford, Fl.	7,880	6,987	3,470	64	+3	3,910	2,527	31
02358000	Apalachicola River at Chattahoochee, Fl.	17,200	22,570	4,750	35	−39	4,470	2,890	18
02467000	Tombigbee River at Demopolis lock and dam near Coatopa, Ala.	15,400	23,300	2,517	53	−20	4,950	3,199	29
02489500	Pearl River near Bogalusa, La.	6,630	9,768	1,845	69	−21	1,670	1,079	31
03049500	Allegheny River at Natrona, Pa.	11,410	[1]19,480	[1]7,629	138	−63	5,880	3,800	25
03085000	Monongahela River at Braddock, Pa.	7,337	[1]12,510	[1]4,043	95	−72	4,950	3,199	21
03193000	Kanawha River at Kanawha Falls, W.Va.	8,367	12,590	4,239	94	−48	11,300	7,300	25
03234500	Scioto River at Higby, Ohio	5,131	4,547	687	56	−77	960	620	29
03294500	Ohio River at Louisville, Ky.[2]	91,170	116,00	34,760	95	−59	55,100	35,610	28
03377500	Wabash River at Mount Carmel, Ill.	28,635	27,220	8,360	92	−65	4,980	3,218	29
03469000	French Broad River below Douglas Dam, Tenn.	4,543	6,798	1,927	60	+12	.....	.....	...
04084500	Fox River at Rapide Croche Dam, near Wrightstown, Wis.[2]	6,150	4,163	4,173	194	−14	2,459	1,589	31
04264331	St. Lawrence River at Cornwall, Ontario–near Massena, N.Y.[3]	299,000	242,700	326,500	124	−2	331,000	213,900	31
02NG001	St. Maurice River at Grand Mere, P.Q.	16,300	25,150	11,500	69	−57	22,100	14,280	28
05082500	Red River of the North at Grand Forks, N.Dak.	30,100	2,551	2,386	208	−46	1,900	1,230	25
05133500	Rainy River at Manitou Rapids, Minn.	19,400	11,830	10,100	100	−35	9,430	6,094	22
05330000	Minnesota River near Jordan, Minn.	16,200	3,402	7,445	573	−33	5,930	3,830	31
05331000	Mississippi River at St. Paul, Minn.	36,800	[1]10,610	22,750	311	−18	22,700	14,025	31
05365500	Chippewa River at Chippewa Falls, Wis.	5,600	5,100	5,088	176	−11	1,800	1,160	31
05407000	Wisconsin River at Muscoda, Wis.	10,300	8,617	6,836	130	−8	6,327	4,089	31
05446500	Rock River near Joslin, Ill.	9,551	5,873	5,100	159	−43	4,300	2,780	31
05474500	Mississippi River at Keokuk, Iowa	119,000	62,620	84,900	212	−26	69,800	45,110	31
06214500	Yellowstone River at Billings, Mont.	11,796	7,038	5,760	106	−53	4,930	3,186	29
06934500	Missouri River at Hermann, Mo.	524,200	79,490	75,190	134	−44	70,000	45,000	31
07289000	Mississippi River at Vicksburg, Miss.[4]	1,140,500	576,600	347,500	103	−35	320,000	207,000	25
07331000	Washita River near Dickson, Okla.	7,202	1,368	276	79	−52	260	168	31
08276500	Rio Grande below Taos Junction Bridge, near Taos, N.Mex.	9,730	725	429	149	−84	340	219	31
09315000	Green River at Green River, Utah	40,600	6,298	3,787	118	−69	3,270	2,113	20
11425500	Sacramento River at Verona, Calif.	21,257	18,820	12,719	119	−7	13,100	8,470	27
13269000	Snake River at Weiser, Idaho	69,200	18,050	12,450	112	−3	14,100	9,110	31
13317000	Salmon River at White Bird, Idaho	13,550	11,250	5,180	90	−50	4,560	2,947	31
13342500	Clearwater River at Spalding, Idaho	9,570	15,480	3,100	82	−50	3,350	2,165	30
14105700	Columbia River at The Dalles, Oreg.[5]	237,000	[1]193,100	[1]112,600	78	−41	119,200	77,040	26
14191000	Willamette River at Salem, Oreg.	7,280	[1]23,510	[1]3,190	79	−36	6,490	4,194	26
15515500	Tanana River at Nenana, Alaska	25,600	23,460	47,330	86	−30	43,000	27,800	31
08MF005	Fraser River at Hope, B.C.	83,800	96,290	115,800	92	−40	82,980	53,630	29

[1]Adjusted.
[2]Records furnished by Corps of Engineers.
[3]Records furnished by Buffalo District, Corps of Engineers, through International St. Lawrence River Board of Control. Discharges shown are considered to be the same as discharge at Ogdensburg, N.Y. when adjusted for storage in Lake St. Lawrence.
[4]Records of daily discharge computed jointly by Corps of Engineers and Geological Survey.
[5]Discharge determined from information furnished by Bureau of Reclamation, Corps of Engineers, and Geological Survey.

GROUND-WATER CONDITIONS DURING AUGUST 1986

Ground-water levels rose and fell in an irregular regional pattern in the Northeast. (See map.) Levels continued declining seasonally in central Connecticut and Massachusetts and in Maryland and Delaware. Levels fell also in western Pennsylvania. However, levels rose in most of Maine, central New Hampshire, southern Vermont, most of Rhode Island, and east-central New York State. Levels remained above average for this time of year in much of Massachusetts, southern Vermont, northern Connecticut, and most of New York State. Levels were also above average in Maine. Recharge from above-average during the month caused levels in some wells in New England and New York to be at or near the highest August levels in 30 to 40 years. By contrast, below-average water-level conditions persisted in Maryland, Delaware, southern New Jersey, and on Long Island, New York.

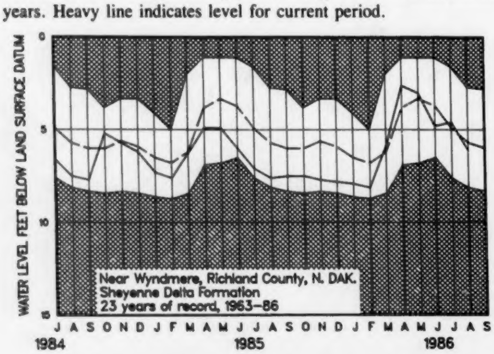
In the Southeastern States, ground-water levels declined in West Virginia, Kentucky, Arkansas, Louisiana, and Mississippi. Levels in Georgia were about the same or declined slightly. Trends were mixed in Virginia and North Carolina. Water levels were above average in Kentucky, mixed with respect to average in West Virginia, Virginia, and North Carolina, and below average in Arkansas, Louisiana, and in much of Florida. New low ground-water levels for August occurred in Tennessee, Florida, and in several key wells in Mississippi. A new all-time low level was reached in the key well in the

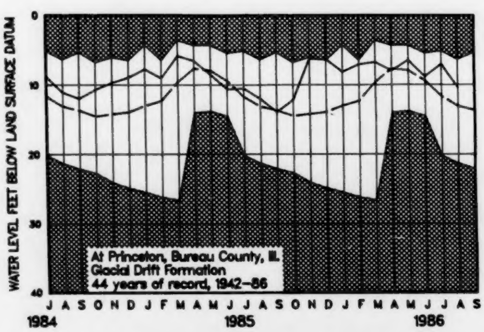


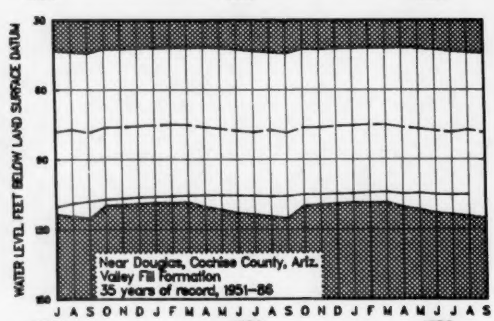
Map showing ground-water storage near end of August and change in ground-water storage from end of July to end of August.

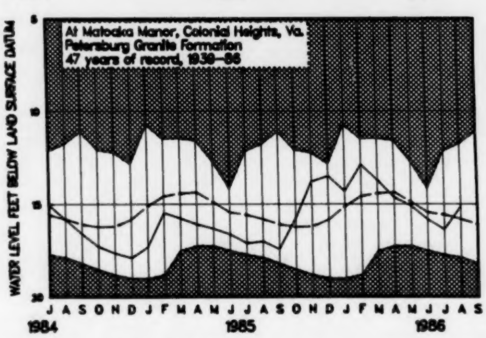
MONTH-END GROUND-WATER LEVELS IN KEY WELLS

Unshaded area indicates range between highest and lowest record for the month. Dashed line indicates average of monthly levels in previous years. Heavy line indicates level for current period.









NOTE: June and July record lows as shown in 1986 for water levels at Matoaka Manor, Colonial Heights, Va., were shown incorrectly in the July 1986 issue. The corrected graph is shown above.

Savannah area in the coastal plain of Georgia in 30 years of record. Five other wells in Georgia, mostly the southwestern part of the State, also recorded new all-time low water levels; these wells averaged 8 years of record.

In the central and western Great Lakes States, ground-water levels declined in Wisconsin, Michigan, Indiana, and Iowa; trends were mixed in Minnesota. Water levels were near or above average in Wisconsin, and mixed with respect to average in Minnesota, Michigan, and Iowa.

In the Western States, ground-water levels showed mixed trends in Idaho, Nebraska, Utah, Kansas, Arizona, and Texas. Water levels declined in Washington, North Dakota, southern California, Nevada, and New Mexico. Water levels were above average in Nebraska and mixed with respect to average in Idaho, North Dakota, southern California, Nevada, Utah, Kansas, New Mexico, and Texas. Levels were below average in Washington and Arizona. New high ground-water levels for August occurred in Utah and New Mexico, and a new low level for August was reached in Texas. In Nevada, a new all-time low level was established in the Las Vegas Valley key well in 40 years of record.

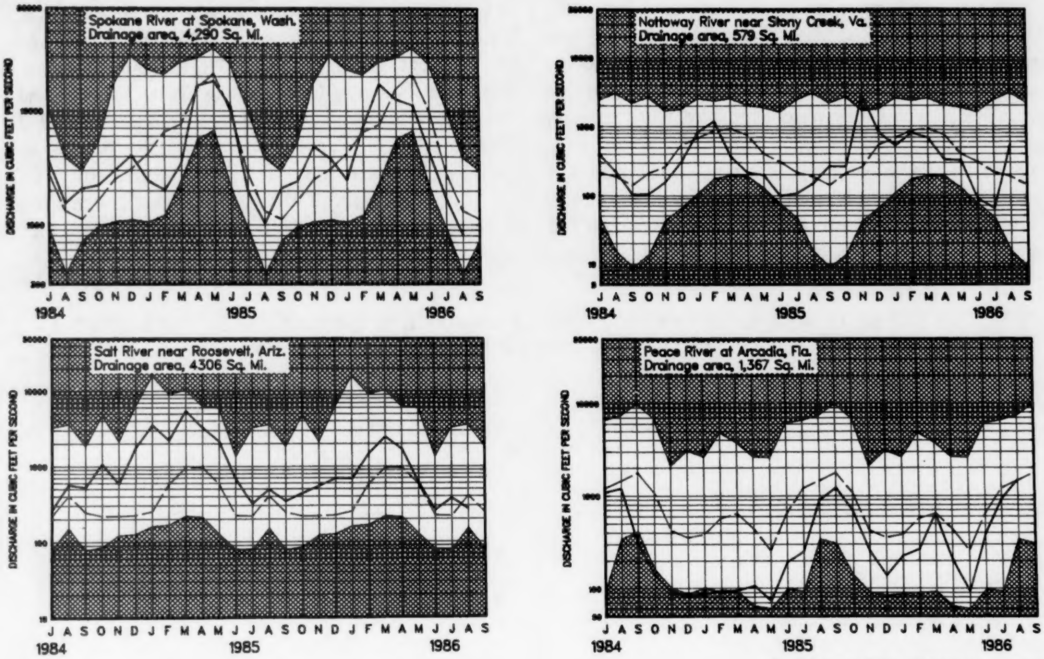
Provisional data; subject to revision

WATER LEVELS IN KEY OBSERVATION WELLS IN SOME REPRESENTATIVE AQUIFERS IN THE CONTERMINOUS UNITED STATES—AUGUST 1986

Aquifer and Location	Water level in feet with reference to land-surface datum	Departure from average in feet	Net change in water level in feet since:		Year records began	Remarks
			Last month	Last year		
Glacial drift at Hanska, south-central Minnesota.	−5.30	+1.98	−0.23	−0.95	1942	
Glacial drift at Roscommon in north-central part of Lower Peninsula, Michigan.	−4.73	+0.24	−0.41	−0.12	1935	
Glacial drift at Marion, Iowa	−4.58	+1.62	−0.66	+3.44	1941	
Glacial drift at Princeton in northwestern Illinois.	−10.43	+2.68	−3.39	+1.65	1943	
Petersburg Granite, southeastern Piedmont near Fall Zone, Colonial Heights, Virginia.	−15.14	+0.70	+1.23	+1.86	1939	
Glacial outwash sand and gravel, Louisville, Kentucky (U.S. well no. 2).	−17.74	+7.19	−0.08	−1.01	1946	
500-foot sand aquifer near Memphis, Tennessee (U.S. well no. 2).	−106.02	−16.20	−0.12	−1.34	1941	August low.
Granite in eastern Piedmont Province, Chapel Hill, North Carolina (U.S. well no. 5).	−44.15	−2.10	−0.53	−2.00	1931	
Sparta Sand in Pine Bluff industrial area, Arkansas.	−225.50	−17.59	−3.45	−5.25	1958	
Eutaw Formation in the City of Montgomery, Alabama (U.S. well no. 4).	−27.9	−4.3	+0.3	−5.3	1952	
Limestone aquifer on Cockspur Island, Savannah area, Georgia (U.S. well no. 6).	−37.65	−10.00	−0.05	−3.35	1956	All-time low.
Sand and gravel in Puget Trough, Tacoma, Washington.	−113.68	−2.34	−1.65	+0.60	1952	
Pleistocene glacial outwash gravel, North Pole, northern Idaho (U.S. well no. 3).	−462.1	−3.7	−0.4	−3.3	1929	
Snake River Group: Snake River Plain Aquifer, at Eden, Idaho (U.S. well no. 4).	−119.3	−3.2	+1.2	+0.1	1957	
Alluvial valley fill in Flowell area, Millard County, Utah (U.S. well no. 9).	−12.77	+28.04	+1.78	−2.63	1929	
Alluvial sand and gravel, Platte River Valley, Ashland, Nebraska (U.S. well no. 6).	−4.90	+1.07	−0.13	+0.80	1935	
Valley fill in northwest Las Vegas Valley, southern Nevada (U.S. well no.1)	−89.40	−60.64	−2.01	−1.28	1946	All-time low.
Pleistocene terrace deposits in Kansas River valley, at Lawrence, northeastern Kansas.	−18.68	+2.33	−1.05	−0.28	1953	
Alluvium and Paso Robles clay, sand, and gravel, Santa Maria Valley, California	−140.38	−0.24	−17.86	−29.71	1957	
Valley fill, Elfrida area, Douglas, Arizona (U.S. well no. 15).	−105.1	−23.9	+0.1	+0.8	1951	
Hueco bolson, El Paso area, Texas	−266.96	−17.30	−0.24	−0.45	1965	August low.
Evangeline aquifer, Houston area, Texas	−322.49	−19.42	−10.49	−7.79	1965	

MONTHLY MEAN DISCHARGE OF SELECTED STREAMS

Unshaded area indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period, 1951-80. Heavy line indicates mean for current period.



Provisional data; subject to revision

DISSOLVED SOLIDS AND WATER TEMPERATURES, FOR AUGUST 1986, AT DOWNSTREAM SITES ON SIX LARGE RIVERS

Station number	Station name	August data of following calendar years	Stream discharge during month	Dissolved-solids concentration[a]		Dissolved-solids discharge[a]			Water temperature[b]		
			Mean (cfs)	Minimum (mg/L)	Maximum (mg/L)	Mean (tons per day)	Minimum (tons per day)	Maximum (tons per day)	Mean in °C	Minimum, in °C	Maximum, in °C
01463500	Delaware River at Trenton, NJ	1986	7,560	87	115	2,040	1,280	4,670	23.5	20.5	25.5
	(Morrisville, PA).	1945—85	6,029	67	158	. . . .	505	21,500	. . .	17.5	30.0
		(Extreme yr)		(1945)	(1967)		(1965)	(1955)			
			[c]4,547								
04264331	St. Lawrence River at Cornwall,	1986	326,500	166	167	146,600	144,500	148,500	21.0	20.0	22.5
	Ontario, near Massena, NY	1976—85	286,700	164	170	128,400	113,000	153,000	21.5	19.0	24.0
	(median streamflow at	(Extreme yr)		(1981)	(1978)		(1977)	(1976)			
	Ogdensburg, NY).		[c]263,600								
07289000	Mississippi River at	1986	347,500	270	345	298,900	247,800	345,200	30.0	26.0	32.0
	Vicksburg, MS.	1976—85	391,000	200	306	264,200	118,000	442,000	29.5	26.0	34.0
		(Extreme yr)		(1980)	(1985)		(1977)	(1979)			
			[c]337,900								
03612500	Ohio River at lock and dam 53,	1986	59,000	172	191	. . . .	21,600	35,500	. . .	26.5	30.0
	near Grand Chain, IL (stream-	1955—85	135,000	121	339	. . . .	4,490	246,000	. . .	17.0	30.5
	flow station at Metropolis, IL).	(Extreme yr)		(1983)	(1977)		(1981)	(1958)			
			[c]121,500								
06934500	Missouri River at Hermann,	1986	75,200	313	464	85,500	77,800	132,000	26.0	23.0	27.0
	MO (60 miles west of	1976—85	71,610	218	535	77,950	43,000	180,000	27.0	22.0	31.0
	St. Louis, MO).	(Extreme yr)		(1981)	(1979)		(1977)	(1982)			
			[c]55,910								
14128910	Columbia River at Warrendale,	1986	131,000	83	89	30,600	20,800	36,600	21.0	19.5	21.5
	OR (streamflow station at	1976—85	138,100	71	100	31,900	14,200	52,500	20.5	18.5	22.0
	The Dalles, OR).	(Extreme yr)		(1976)	(1977)		(1978)	(1976)			
			[c]143,550								

[a]Dissolved-solids concentrations, when not analyzed directly, are calculated on basis of measurements of specific conductance.
[b]To convert °C to °F: [(1.8 X °C) + 32] = °F.
[c]Median of monthly values for 30-year reference period, water years 1951—80, for comparison with data for current month.

PRECIPITATION FORECAST FOR SEPTEMBER THROUGH NOVEMBER 1986

(From Monthly and Seasonal Weather Outlook Published by National Weather Service)

NATIONAL WATER CONDITIONS

August 1986

Based on reports from the Canadian and U.S. Field offices; completed September 16, 1986

TECHNICAL STAFF

Thomas G. Ross, Editor
Carroll W. Saboe
John C. Kammerer
Allen Sinnott
Krishnaveni V. Sarma
Sharon A. Edmonds
Carole J. Marlow

COPY PREPARATION

Lois C. Fleshmon
Sharon L. Peterson
Aisha P.R. Law

GRAPHICS

Frances B. Davison
Carolyn L. Moss

The National Water Conditions is published monthly. Subscriptions are free on application to the U.S. Geological Survey, 419 National Center, Reston, VA 22092.

EXPLANATION OF DATA (Revised August 1986)

Cover map shows generalized pattern of streamflow for the month based on provisional data from 184 index gaging stations—18 in Canada, 164 in the United States, and 2 in the Commonwealth of Puerto Rico. Alaska, Hawaii, and Puerto Rico inset maps show streamflow only at the index gaging stations that are located near the point shown by the arrows. Classifications on map are based on comparison of streamflow for the current month at each index station with the flow for the same month in the 30-year reference period, 1951–80. Shorter reference periods are used for one Canadian index station, two Kansas index stations, one New York index station, and the Puerto Rico index stations because of the limited records available.

The comparative data are obtained by ranking the 30 flows for each month of the reference period in order of decreasing magnitude—the highest flow is given a ranking of 1 and the lowest flow is given a ranking of 30. Quartiles (25-percent points) are computed by averaging the 7th and 8th highest flows (upper quartile), 15th and 16th highest flows (middle quartile and median), and the 23rd and 24th highest flows (lower quartile). The upper and lower quartiles set off the highest 25 percent of flows and lowest 25 percent of flows, respectively, for the reference period. The median (middle quartile) is the middle value by definition. For the reference period, 50 percent of the flows are greater than the median, 50 percent are less than the median, 50 percent are between the upper and lower quartiles (in the normal range) 25 percent are greater than the upper quartile (above normal), and 25 percent are less than the lower quartile (below normal). Flow for the current month is then classified as; *above normal* if it is greater than the upper quartile, *in the normal range* if it is between the upper and lower quartiles, and *below normal* if it is less than the lower quartile. Change in flow from the previous month to the current month is classified as *seasonal* if the change is in the same direction as the change in the median. If the change is in the opposite direction of the change in the median, the change is classified as *contraseasonal* (opposite to the seasonal change). For example: at a particular index station, the January median is greater than the December median; if flow for the current January increased from December (the previous month), the increase is seasonal; if flow for the current January decreased from December, the decrease is contraseasonal.

Flood frequency analyses define the relation of flood peak magnitude to probability of occurrence or recurrence interval. *Probability of occurrence* is the chance that a given flood magnitude will be exceeded in any one year. *Recurrence interval* is the reciprocal of probability of occurrence and is the *average* number of years between occurrences. For example, a flood having a probability of occurrence of 0.01 (1 percent) has a recurrence interval of 100 years. *Recurrence intervals imply no regularity of occurrence;* a 100-year flood might be exceeded in consecutive years or it might not be exceeded in a 100-year period.

Statements about *ground-water levels* refer to conditions near the end of the month. The water level in each key observation well is compared with average level for the end of the month determined from the 30-year reference period, 1951-80, or from the entire past record for that well when only limited records are available. Comparative data for ground-water levels are obtained in the same manner as comparative data for streamflow. *Changes in ground-water levels,* unless described otherwise, are from the end of the previous month to the end of the current month.

Dissolved solids and temperature data for August are given for six stream-sampling sites that are part of the National Stream Quality Accounting Network (NASQAN). *Dissolved solids* are minerals dissolved in water and usually consist predominately of silica and ions of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, sulfate, chloride, and nitrate. *Dissloved-solids discharge* represents the total daily amount of dissolved minerals carried by the stream. *Dissolved-solids concentrations* are generally higher during periods of low streamflow, but the highest dissolved-solids *discharges* occur during periods of high streamflow because the total quantities of water, and therefore total load of dissolved minerals, are so much greater than at times of low flow.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
NATIONAL CENTER, STOP 419
RESTON, VIRGINIA 22092

OFFICIAL BUSINESS

Return this sheet to above address, if you do NOT wish to receive this material ☐, or if change of address is needed ☐ (indicate change, including ZIP code).

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF THE INTERIOR
INT 413

U.S. MAIL

FIRST CLASS

SPECIAL PROCESSING DEPT NWC
MARCIA KOZLOWSKI
XEROX/UNIVERSITY MICROFILMS
ANN ARBOR MI 48106